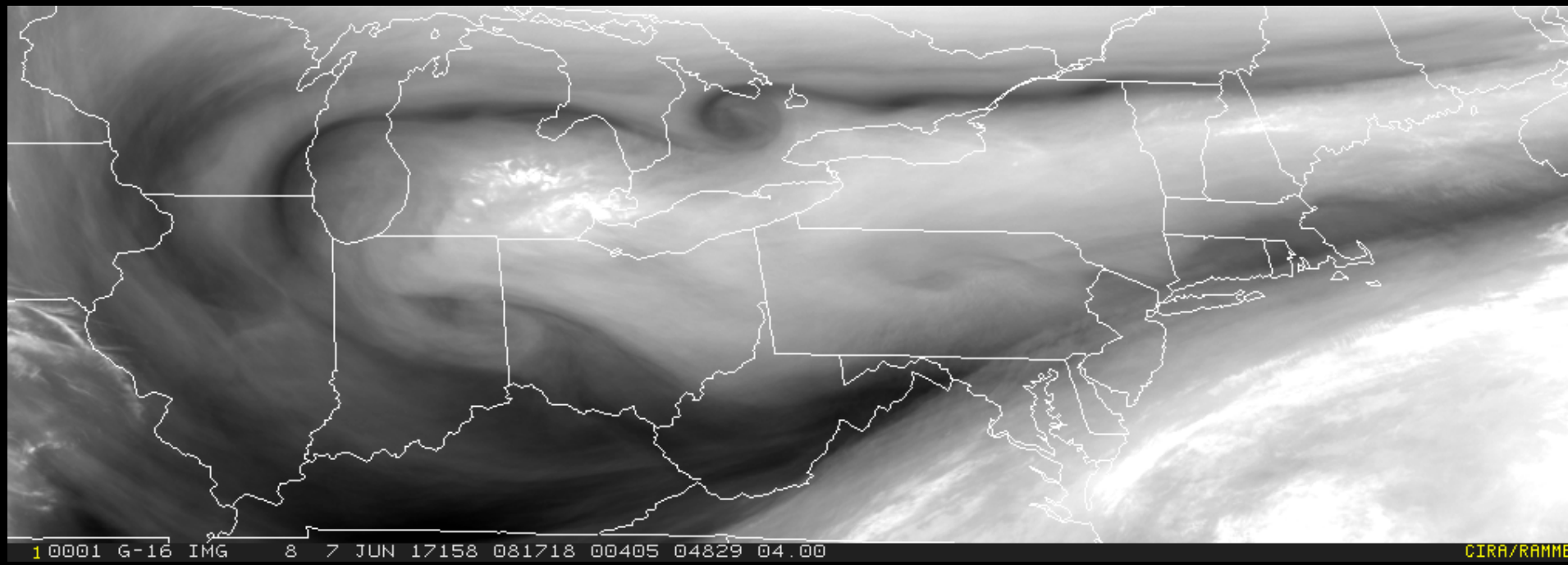
GOES-16 Product Quality and Distribution



Upper-level vortices over NE U.S.

http://rammb.cira.colostate.edu/ramsdis/online/loop_of_the_day/

NOAA Satellite Conference

July, 2017 - New York, NY

Matthew Seybold,

GOES-R Data Operations Manager and Team Lead for Product Readiness & Operations (PRO)

L1b Science Product Validation Status

ABI L1b Product	Beta	Provisional	Full
Radiances	2/28/17	6/1/17	6/5/18
GLM L2 Product			
Lightning: Events, Groups, Flashes	7/5/17	11/1/17	6/5/18
SEISS L1b Products			
Energetic Heavy Ions	2/10/17	11/1/17	6/1/18
Magnetospheric e^-/p^+: Low Energy	2/10/17	11/1/17	6/1/18
Magnetospheric e^-/p^+: High Energy	2/10/17	11/1/17	6/1/18
Solar & Galactic Protons	2/10/17	11/1/17	6/1/18
EXIS L1b Product			
Solar Flux: EUV	3/23/17	11/2/17	6/1/18
Solar Flux: X-ray Irradiance	3/23/17	11/2/17	6/1/18
SUVI L1b Product			
Solar EUV Imagery	4/19/17	11/2/17	6/1/18
MAG L1b Product			
Geomagnetic Field	5/25/17	11/2/17	10/9/18

Validation Maturity Levels: Not Validated | Beta Maturity | Provisional Maturity | Full Maturity

L2+ Science Product Validation Status

ABI L2+ Products	Beta	Prov	Full
Cloud and Moisture Imagery (CMI) and Sectorized CMI (KPP)	2/28/17	6/1/17	9/3/18
Aerosol Detection (Smoke & Dust)	5/24/17	1/26/18	9/3/18
Aerosol Optical Depth (AOD)	5/24/17	1/26/18	9/3/18
Clear Sky Mask	4/19/17	12/1/17	9/3/18
Cloud Optical Depth	6/8/17	2/23/18	9/3/18
Cloud Particle Size Distribution	6/8/17	2/23/18	9/3/18
Cloud Top Height	5/16/17	12/22/17	9/3/18
Cloud Top Phase	5/16/17	12/22/17	9/3/18
Cloud Top Pressure	5/16/17	12/22/17	9/3/18
Cloud Top Temperature	5/16/17	12/22/17	9/3/18
Derived Motion Winds	6/8/17	2/23/18	9/3/18
Derived Stability Indices	5/16/17	12/22/17	9/3/18

ABI L2+ Products	Beta	Prov	Full
Downward S/W Radiation: Surface	6/23/17	3/16/18	9/3/18
Fire/Hot Spot Characterization	5/24/17	1/26/18	9/3/18
Hurricane Intensity Estimation	9/8/17	12/1/17	9/3/18
Land Surface Temperature	5/24/17	1/26/18	9/3/18
Legacy Vertical Moisture Profile	5/16/17	12/22/17	9/3/18
Legacy Vertical Temperature Profile	5/16/17	12/22/17	9/3/18
Rainfall Rate/QPE	8/1/17	TBD	9/3/18
Reflected S/W Radiation: TOA	6/23/17	3/16/18	9/3/18
Sea Surface Temperature	6/14/17	1/26/18	9/3/18
Snow Cover	12/30/17*	3/30/18*	9/3/18*
Total Precipitable Water	5/16/17	12/22/17	9/3/18
Volcanic Ash: Detection and Height	8/1/17	2/23/18	9/3/18

Validation Maturity Levels: Not Validated | Beta Maturity | Provisional Maturity | Full Maturity

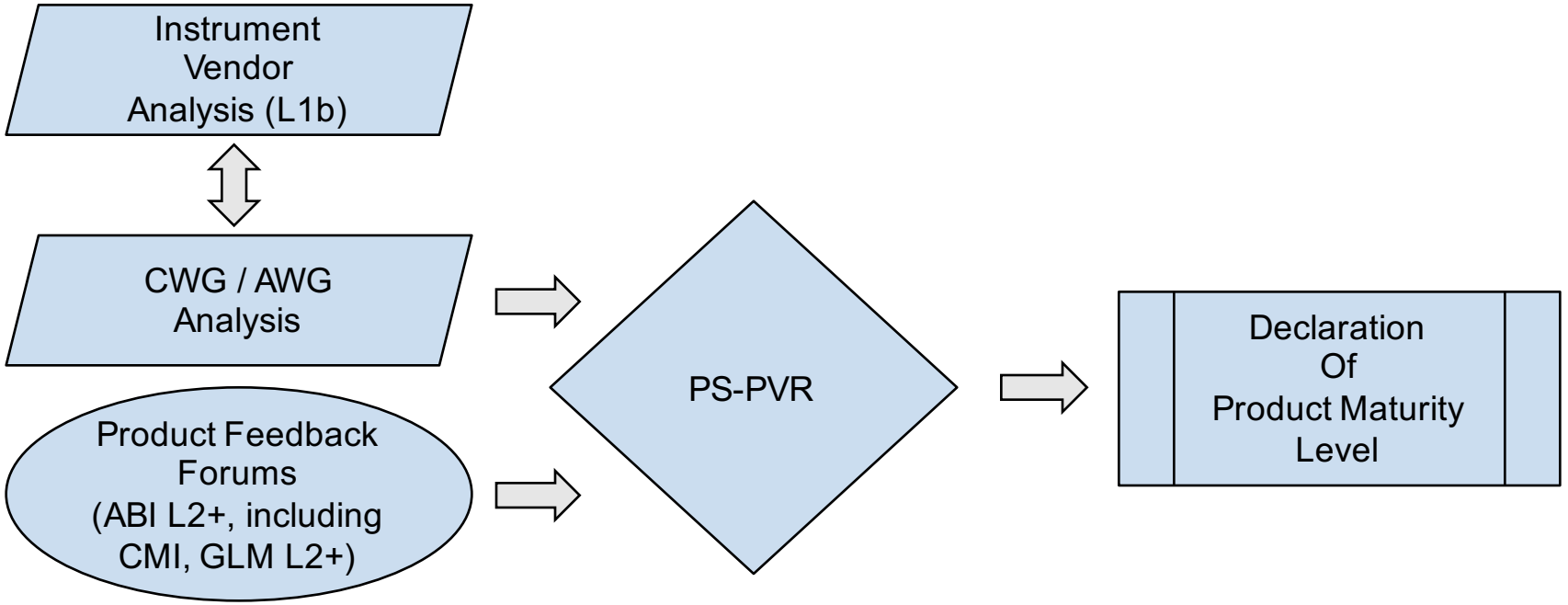
**Snow Cover has a waiver. It is dependent upon a non-baseline Albedo Product which is in development.*

Outline

- Product Validation Maturity Process
- Current GOES-16 Data Caveats
- Product Distribution

Product Validation Maturity Levels Are Determined in "PS-PVR" Reviews

- A Peer Stakeholder - Product Validation Review (PS-PVR) appraises the status of product quality with respect to GOES-R Program definitions.
- Outcomes of PS-PVRs:
  1. Declares products have achieved a product maturity level (Beta, Prov., Full)
  2. Provides guidance on work expected to achieve the next maturity level
  3. Plans release of data through product distribution outlets



Product Maturity Levels

What do the three Product Maturity Levels mean?

Beta: The product is made available to users to gain familiarity with data formats and parameters. The product has been minimally validated and may still contain significant errors.

Provisional: Product analyses are sufficient to communicate product performance to users including documentation of known issues. The product performance has been demonstrated through a large, but still (seasonally or otherwise) limited, number of independent measurements. The analysis is sufficient for limited qualitative determinations of product fitness-for-purpose, and the product is potentially ready for testing operational use.

Full: Product is operational. All known product anomalies are resolved and/or documented and shared with the user community.

Data Caveats - ABI L1b Radiances

Caveats that have been identified and are under analysis. Solutions are in development and testing:

1. Navigation may have errors up to 4 km.
2. Band-to-band co-registration errors may be up to 8 km. Larger errors occur between bands from the three groups of bands (1-6, 7-11, and 12-16 – they are in three different focal plane assemblies [FPA]).
3. Frame-to-frame registration may be unstable, causing features to "jump" in animation.
4. Image striping may occur across all 16 bands.
5. Band 2 radiances are about 7% brighter than comparable polar satellite observations.
6. The infrared (IR) radiance measurements for ABI Scan Mode 3 CONUS and MESO observations demonstrate an artificial periodicity of 15 minutes. The amplitude is uniformly small in terms of radiance but can exceed 1 K in terms of brightness temperature for cold scenes. This effect may be larger during some times of day as well as some bands.
7. Stray light exists for Visible and Near IR (VNIR) bands approximately one hour before and after satellite local midnight during the eclipse season before the vernal (spring) equinox and after the autumnal (fall) equinox, and may exist in other days of the year. Total duration of impact is approximately twenty days twice per year. Band 7 experiences residual stray light effects during the same time frames.
8. The VNIR band radiometric calibration may cause frequent but minor discontinuities in radiance values following each solar calibration.

Data Caveats - ABI L2 Cloud & Moisture Imagery

All radiance caveats noted on the prior slide are also valid for CMI. The following also apply for CMI:

1. The maximum reflectance value is currently capped at 1.0 which causes dark patches within high reflectance scenes.
2. There may be artificially cold pixels surrounding hot spots.
3. The multiband files do not have the correct downscaling method listed in the metadata.
4. The kappa0 value reported in the product is inconsistent with the correct kappa0 value applied to the reflectance factors.
5. There are inconsistent data quality flag (DQF) values for off-Earth pixels.
6. On occasion, the start time of a single band file is different from the other bands by 0.1 seconds.

Access Points to GOES-16 Data

Direct Readout (requires receiving system)

GRB	GOES Rebroadcast (L1b)
HRIT/EMWIN	High Rate Information Transmission/Emergency Managers Weather Information Network (select ABI L2 CMI)
GNC-A	GEONETCast-Americas (select ABI L2 CMI and other ABI L2 once Provisional)

Terrestrial Access (L1b & L2+)

PDA	Product Distribution & Access System • Operational real-time user subscriptions
CLASS	Comprehensive Large Array-data Stewardship System • Request and setup access

GOES-16 Data in HRIT/EMWIN

Cloud and Moisture Imagery (CMI) Full Disk Imagery

1. Band 2 (0.64um) with 2 km resolution
2. Band 7 (3.9um) with 2 km resolution
3. Band 8 (6.2um) with 2 km resolution
4. Band 9 (6.9um) with 2 km resolution
5. Band 13 (10.3um) with 2 km resolution
6. Band 14 (11.2um) with 2 km resolution
7. Band 15 (12.3um) with 2 km resolution

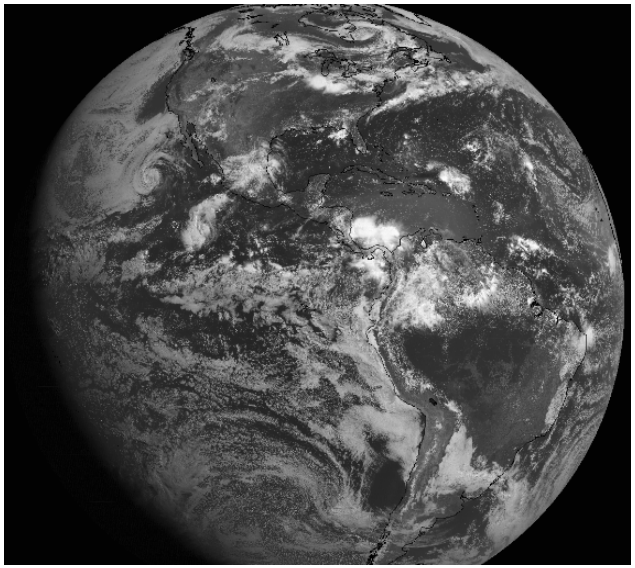
Plus - Mesoscale for Bands 2,7,8

The frequency is 1694.1 MHz. The data rate is 400 Kbps.

GOES-16 Data in GEONETCast-Americas

Cloud and Moisture Imagery (CMI)

1. Band 2 (0.64um) with 1 km resolution
2. Band 7 (3.9um) with 2 km resolution
3. Band 8 (6.2um) with 2 km resolution
4. Band 9 (6.9um) with 2 km resolution
5. Band 13 (10.3um) with 2 km resolution
6. Band 14 (11.2um) with 2 km resolution
7. Band 15 (12.3um) with 2 km resolution



- 12 megabit per second broadcast is in place
- 19 (Non-CMI) ABI L2 products will be added once Provisional
- Catalog: www.geonetcastamericas.noaa.gov/pubs/section-1/GEONETCast-Americas%20Product%20Catalog%20-%20V20152110.pdf


Ice in Hudson Bay
Impressive resolution even at high latitudes
http://rammb.cira.colostate.edu/ramsdis/online/loop_of_the_day/
1 0002 G-16 IMG 2 3 JUL 17184 120000 00101 05001 01.00
CIRA/RAMMB

Points of Contact

Matthew.Seybold@noaa.gov

GOES-R User Services: Kathryn.Mozer@noaa.gov
GOES-16 ABI L2+ Products: Wayne.MacKenzie@noaa.gov

Distribution
GOES Rebroadcast (GRB): James.McNitt@noaa.gov
HRIT/EMWIN: Seth.Clevenstine@noaa.gov
GNC-A: Hongming.Qi@noaa.gov
GOES-16 data in PDA: Donna.McNamara@noaa.gov
GOES-16 data in CLASS: Elizabeth.Kline@noaa.gov

GOES-16 Data Caveats: https://www.ncdc.noaa.gov/data-access/satellite-data/goes-r-series-satellites